REMARKS

The undersigned attorney, William A. Blake, would like to thank Examiner Alomari and his acting supervisor, Christian Laforgia, for the courtesy shown during the personal interview that was conducted on August 23, 2005. During the interview, Mr. Blake highlighted a key distinction between the subject invention and the system disclosed in EP 0311112 to Yoshizawa, which forms the basis for the rejection of claims 25-30, 34, 35 (note there appears to be a typo in the Office Action in this regard), 45, 50-52, 55 and 57-60 under 35 U.S.C. 102(b). Both Examiners acknowledged this distinction but suggested that the proposed changes to claim 25 were not sufficient enough to emphasize this distinction. Applicant respectfully submits that the final changes that have been made to claim 25 (and claim 52) satisfy this requirement and overcome the rejection. A detailed discussion of the foregoing issue follows.

The subject invention relates to a method and apparatus for securely transferring data between a transmitter and a receiver. Typical applications of the invention include wireless remote controllers for garage door openers, televisions, etc. It is especially desirable in the case of security related applications, such as garage door openers, that only authorized remote controllers be able to communicate with the receiver that controls actuation of a device, such as a door opener. One technique for insuring that only a select remote transmitter encoder can communicate with a receiver decoder is disclosed in the Yoshizawa reference. In the Yoshizawa system, timer based data from the encoder and the decoder is compared after both the encoder and decoder timers are manually reset simultaneously during a synchronization step. The system provides a warning when timer drift results in excessive differences and requires manual intervention by the user to re-synchronize the clocks by resetting them.

Yoshizawa intended, for example, to prevent "pirate" remote controls from operating a device like a TV. As such it was stated that a captured code may be used but only for a short time. This is, of course, much different from a security application such as locking a door, where this unauthorized access would be totally unacceptable for the time periods foreseen in Yoshizawa. This shortcoming was driven by the fact that Yoshizawa did not have automatic timer drift adjustment and thus having the undesirable requirement that the user must act to affect synchronization in a cumbersome way, the allowed drift was made large to reduce the frequency of re-synchronization.

The foregoing limitations of the Yoshizawa system act as notable drawbacks if one desires to apply the concept to a system having multiple remote controls, for example, as is often the case with garage door openers. As noted before, during the synchronization step in Yoshizawa, both the encoder and decoder timers (counters) must be manually reset, preferably at the same instant. This makes it totally impractical to use more than one encoder with a single decoder. This multiple encoder usage with a single decoder is a typical requirement for applications such as door locks, vehicle remote keyless entry (RKE) systems, and garage door controllers. Additionally, the fact that the Yoshizawa system cannot automatically adjust for timer drift also makes the system totally impractical for these applications.

To address the foregoing problems, Applicant devised a system which first and foremost does not require reset at all of any transmitter or receive timers or clocks. In addition, the system automatically adjusts for drift in the timer values so that no user intervention is necessary to maintain the necessary synchronization of the system timers. More particularly, the subject system employs what is referred to as a Timer Relationship Value (TRV). The TRV represents an intermediate value that forms the link between the real time of the transmitter clock and that

of the receiver clock. This means that no adjustment of either clock is required in the process of synchronizing the transmitter and receiver. In the preferred embodiment, the TRV is generated during a learning process during which the decoder receives the transmitter clock value from the transmitter and determines the difference between the transmitter clock value and the receiver clock value. The TRV is then used each time a data transmission is received from the transmitter encoder to measure the difference between the encoder and decoder clock values and then compare that measurement to the TRV stored in the decoder. To accommodate timer drift, the decoder automatically adjusts the TRV value as necessary to maintain the measurements within a certain tolerance. This is in direct contrast with what is taught by Yoshizawa.

To highlight the foregoing distinctions, both independent claims, 25 and 52, have been amended to specify the timer relationship value is generated by the decoder and stored therein during a learning process using the value of the decoder clock and the value of the encoder clock which is received by the decoder form the encoder or transmitter. Clearly, even though the Yoshizawa system compares clock values during operation, that system does not transmit the clock value of the encoder to the decoder during a learning process. Instead, as mentioned before, Yoshizawa's system requires simultaneous resetting of the transmitter and receiver clocks at system start up. For at least this reason, claims 25 and 52 as amended are patentable and allowable over Yoshizawa. This also applies to the various dependent claims. In addition, as discussed in detail below, these dependent claims add other significant features of the invention that further distinguish the same over Yoshizawa.

Claim 26 specifies that the timer relationship value in the decoder is updated upon receipt of a valid transmission word to remove any discrepancies in the relationship between the encoder timer, decoder timer and the timer relationship value, without affecting the decoder timer. In

essence, this claim is saying the TRV is updated automatically to correct for discrepancies between the encoder and decoder timers. The current invention teaches the fully automatic keeping of synchronization in various levels of complexity in order to not only maintain security but to relieve the user of such tedious and sometimes impractical tasks. In contrast, Yoshizawa only mentions giving an indication to the user that the two clocks are differing to such an extent that operation will be impaired due to security considerations (*Col. 9, lines 20-30; Col. 9, lines 33-40*). It is taught that the user will then have to perform a manual action to reset synchronization. *Col. 9, lines 16-35*: This section states that keyboards 75 (TX) and 85 (RX) be used to modify the time in both TX and RX counters (i.e. timers – *Col. 6, lines 14-16*). As such, for this reason also, Yoshizawa does not disclose the limitations of claim 26. This also applies to claims 27-29, which depend on claim 26.

Claim 34 relates to the high speed timer (HST) aspect of the subject invention, which also is not disclosed or suggested in Yoshizawa. There is no disclosure in the cited art that multiple code words transmitted during a single event of pressing a transmitter activation button can or must be based on a high speed chronological timer as root for the data before the encryption process. This will, of course, result in code words in a single transmit event to be the same, whereas the usage of an HST will result in every code word differing from other code words in the sequence. The passages in Yoshizawa cited by the Examiner have nothing to do with this concept. For this reason also, claim 34 is patentable over Yoshizawa. This also applies to claim 50, which also recites this feature of the invention but in different terms.

Claim 51 recites the feature of the invention wherein the decoder controls the activation of the encoder for resynchronization of the two. Minor clarifying amendments have been made in claim 51 to specify that the decoder generates control signals that are used to, directly or

indirectly, control the activation of the encoder. Yoshizawa does not disclose this concept even broadly. At noted before, Yoshizawa discloses a system wherein a user starts or resets two timers simultaneously. This is by no means the same thing as a system wherein a decoder generates signals to control an encoder in a way that results in a secure re-synchronization event. For this reason also, claim 51 is patentable over Yoshizawa. This also applies to claim 57, which recites the same concept using different terminology.

Claim 58 specifies that the transmitter includes an encoder timer and an encryption unit for encrypting data which at least in part is based on timer information from the encoder timer thereby to form the transmission word, and wherein the encoder timer is permitted to run only for a limited period after each activation of the transmitter. Contrary to the assertions made by the Examiner, There is no mention in Yoshizawa of a timer running for a limited period of time subsequent to an activation. For this reason also, claim 58 is patentable over Yoshizawa.

Applicant also respectfully submits that, contrary to the assertions made by the Examiner, the detailed limitations of claim 59 which specify that when the encoder timer runs beyond a predetermined limit, the transmitter will upon a single activation transmit more than one transmission value equivalent to the transmitter being activated twice, are also not disclosed in Yoshizawa. The passages in Yoshizawa noted by the Examiner simply do not disclose this specific concept and Applicant invites the Examiner to cite the particular language in Yoshizawa that is read on by claim 59. For this reason also, claim 59 is patentable over Yoshizawa.

Turning now to the obviousness rejections set forth in the Office Action, claims 31-33, 36 and 37 stand rejected under 35 U.S.C. 103 as being unpatentable over Yoshizawa in view of US Patent 6028527 to Soenen et al.

As noted previously, claim 25 has been amended to overcome the rejection over Yoshizawa. As a result, the rejection of claim 31-33, 36 and 37 is also overcome. Further, these claims are also patentable for the following additional reasons.

Regarding claims 31-33, these cover the cold boot counter (CBC) feature of the subject invention. The CBC is a practical method to maintain a level of security whilst offering the user friendliness of transparent synchronization and seemingly uninterrupted operation after a loss of power especially at the transmitter side. This loss of power may have been induced as part of an effort to defeat the security and thus the requirement for the CBC.

Contrary to the assertions in the Office Action, Applicant respectfully submits that Soenen does not disclose or suggest the CBC concept. Soenen has nothing to do with a time based security system, which is what the CBC concept is all about. The passages in Soenen noted in the Office Action disclose only that a counter is rest upon the detected edge of a rising pulse. Soenen does not disclose resetting of a counter upon a loss of power, nor does it disclose transmitting of a counter value to a decoder. For these reasons also, claim 31-33 are patentable over the cited references.

Regarding claim 36, the section in Soenen cited by the examiner (Col. 20, lines 20 – Col. 21, line 26) does not disclose information transferred from a TX to an RX during learn mode and furthermore does not indicate the deriving of a key in the decoder from information transferred from the encoder. Further, as to claim 37, the cited sections in Soenen, Col. 6, lines 41-49 and Col. 22, lines 39-50, do not specify the use of a FIFO storage protocol. For these reasons also, Applicant respectfully submits that claims 36 and 37 are patentable.

Claims 38-44, 46-49, 53 and 56 stand rejected under 35 U.S.C. 103 as being unpatentable over Yoshizawa in view of US Patent 6009131 to Hiramatsu.

Claim 38 is hereby cancelled, since its limitations are now effectively added to claim 25. However, Applicant respectfully submits that both claims 25 and 52 are patentable over Yoshizawa in view of Hiramatsu because of the following reasons.

Hiramatsu discloses a synchronizer which detects frame timing of a transmitter and a receiver and adjusts the timing as necessary to synchronize the two devices. Timing information is derived from known data words and is used to adjust timing in the receiver to yield optimum sampling points. This is in no way related to the use of chronological time as a variable to provide security by resulting in absolutely unpredictable (hence unknown) data at the receiver. In In the subject invention as recited in claims 25 and 52, chronological clock values of the encoder and decoder are used to form the TRV, and the TRV is then used to verify whether subsequent communications are being received by the decode from the encoder. If the measured difference between the clock values increase too much, the TRV is adjusted, but the encoder and decoder timers or clocks remain unchanged. This is clearly a totally different concept than the synchronizer disclosed in Hiramatsu. As a result, the teachings of Yoshizawa and Hiramatsu can not be combined to establish a prima facie case of obviousness under 35 U.S.C. 103. At best, the combination would only suggest to one of skill in the art, that Hiramatsu's system could be employed to improve the data sampling by the decoder, which has nothing to do with security issues. For these reasons, Applicant respectfully submits that claims 25 and 52 as amended are patentable over Yoshizawa, even when taken in combination with Hiramatsu.

For the same reasons, the rejections of claim 39-44, 46-49, 53 and 56 are also overcome. Further, many of these claims are also patentable for the following additional reasons.

Regarding claim 39, this claim has been amended for clarification purposes and recites that multiple encoders are used with a single decoder comprising a single timer and multiple

timer relationship values, wherein the various timer relationship values are determined, one for each encoder, during its respective learning process. This claim highlights the previously noted distinction between the subject invention and Yoshizawa's system. In the Office Action, the Examiner deduces from Col. 5, lines 25-40 in Yoshizawa, that a system of multiple transmitters with a single receiver is disclosed. On the contrary, Yoshizawa in that passage only discloses the use of multiple passwords to a single encoder (transmitter). It is thus clear that Yoshizawa's system was never intended to be used with multiple transmitters and thus would never encounter the problem of multiple transmitter timers to be synchronized with a single decoder timer. Extending the concept of just resetting or starting all encoder and decoder timers at the same time is just totally impractical in general RKE (Remote Keyless Entry) applications, such as disclosed in Yoshizawa. As already noted, the current invention specifically concerns a method where the decoder timer is not modified. For the foregoing reasons also, claim 39 is patentable over the references of record.

Claim 40 specifies the step of ensuring that the encoder timer at its slowest variance is faster than the decoder timer at its fastest variance. Applicant can find no teaching in Hiratmatsu and the Examiner did not point out where the reference allegedly teaches this feature. For this reason also, claim 40 is patentable.

Claim 41 adds to claim 39, that if the decoder timer lies within a predetermined window when a valid transmission word is received, the decoder timer is re-synchronised with the encoder timer by automatically adjusting the timer relationship value to remove any discrepancies in the relationship between the timers and the timer relationship value. Again, Hiratmatsu is concerned with frame timing adjustment, not timer relationship or difference value adjustment. Once again, neither the decoder timer nor the encoder timer in the subject system is

ever adjusted. Only the timer difference value is changed to accommodate clock drift. Yoshizawa teaches only manual reset of the clocks if the drift between them becomes too large. The acceptable drift value is never changed in Yoshizawa's system. One of ordinary skill in the art, having only the teachings of Yoshizawa and Hiramatsu before them, would therefore not be motivated to combine their teachings and arrive at the invention recited in claim 41. For these reasons also, claim 41 is patentable over the references of record.

Claims 43 and 54 recite the feature of the invention wherein the timer relationship value or a window is adjusted in size to compensate for drift between the encoder timer and the decoder timer, before validation occurs, such adjustment being based at least on the time period elapsed since the last adjustment of the timer relationship value. The Examiner asserts that Hiramatsu discloses this concept, but Applicant cannot find any disclosure in Hiramatsu that an adjustment of any kind is made based at least on the time prior elapsed since the last adjustment. At best, Hiramatsu discloses making a frame adjustment each time a UW pattern is detected, regardless of how long it has been since a previous adjustment was made. For this reason as well, claims 43 and 54 re patentable over the references of record.

Claim 44 specifies that the timer relationship value or a window is adjusted in size to compensate for drift between the encoder timer and the decoder timer, such adjustment being based at least on information about the drift between the encoder timer and the decoder timer determined by analysing at least two successive valid transmissions received with a period of time elapsed between them and said adjustment being performed before carrying out step (f) in claim 25 on a currently received transmission word. Once again, Hiramatsu discloses frame synchronization adjustment, not timer relationship value adjustment. Further, contrary to the assertions in the Office Action, Applicant can find no teaching in Hiramatsu that drift is

determined by analyzing two successive valid transmission with a period of time elapsed between them. Similar analysis can be applied to claims 46, 47 and 56. For these reasons also, Applicant respectfully submits that claims 44, 46, 47 and 56 are patentable over the references of record.

Finally, new claims 61-63 have been added which further define the invention over the prior art of record. Theses clams define the cold boot counter function in greater detail and are patentable for the same reasons given in support of claims 30-34.

For the foregoing reasons, Applicant respectfully submits that all of the rejections of the claims are traversed and that all of the claims are patentable and allowable over the references of record. Accordingly, favorable reconsideration is respectfully requested.

Respectfully submitted,

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Dated: September 26, 2005